

Nomenclature Summary

Binary Compounds (2 elements)

Metal and nonmetal

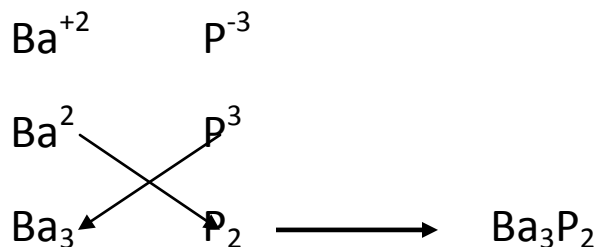
Fixed Charges

Write name from formula

1. Name first element
2. Name the second element
3. Use the root of the second name and add **-ide**
4. Examples:
 - a. NaCl sodium chloride
 - b. CaCl₂ calcium chloride

Write formula from name

1. Write the symbol and charge of the metal
2. Write the symbol and charge of the nonmetal
3. Drop the signs and crisscross the numbers to create subscripts
4. Reduce to simplest whole number ratio if needed
5. Example: barium phosphide



Binary Compounds (2 elements)

Metal and Nonmetal

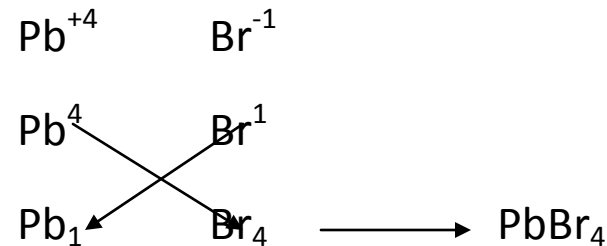
Variable charges: Stock System

Write name from formula

1. Name the first element
2. Assign the oxidation number (charge) to the metal
Convert the metal charge to a Roman numeral
3. Use the root of the second element and add **-ide**
4. Examples:
CuS Cu⁺²S⁻² copper (II) sulfide
Fe₂S₃ Fe⁺³S⁻² iron (III) sulfide

Write formula from name

1. Write the symbol and charge of the metal
2. The Roman numeral is the charge on the metal
3. Write the symbol and charge of the nonmetal
4. Drop the signs and crisscross the numbers to create subscripts
Reduce to simplest whole number if needed
5. Example: lead (IV) bromide



Nomenclature Summary

Binary Compounds

Metal and Nonmetal

Variable Charges: Common (Old) Names

Write name from formula

1. Find the total charge brought to the formula by the non metal.
2. Find the total charge brought to the formula by the metal.
 - a. Divide the total positive charge by the number of ions of metal.
This will be the metal's subscript
3. Check to be sure that the calculated ion charge is correct for that specific ion.
4. Name the root of the metal and add **-ic** or **-ous**
 - a. -ous is the lower oxidation number
 - b. -ic is the higher oxidation number
5. Example:
 - a. Cu_2S
 - i. Sulfide ion has a -2 charge
 - ii. Therefore the copper ions have a total charge of +2. The sum of all the ions is 0.
 - iii. Now divide the total metal charge by the number of copper ions (metal subscript)
 - iv. This specific copper ion has a charge of +1. This is consistent with the known charges of copper ions.
 - v. The name is: cuprous sulfide

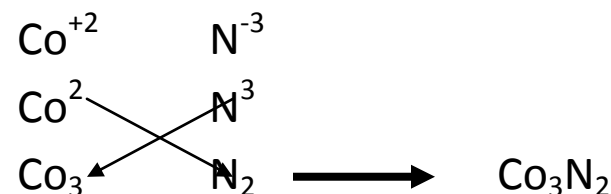
Binary Compounds

Metal and Nonmetal

Variable Charges: Common (Old) Names

Write formula from name

1. Identify the metal ion and the charge from the 1st part of the name.
2. Write the metal symbol and charge.
3. Identify the nonmetal ion and charge.
4. Write the nonmetal ion symbol and charge.
5. Drop the signs and crisscross the numbers to create subscripts.
6. Example: cobaltous nitride



Nomenclature Summary

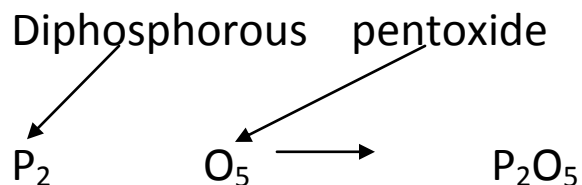
Binary Compounds

Nonmetal and nonmetal: These are molecular compounds and form molecules. The formulas tell how many atoms you need to build the molecule. NO reduction of subscripts is needed.

Greek System: the prefixes indicate the numbers of atoms of an element are needed to make up the molecule.

Write formula from the name

1. Determine the number of atoms of the 1st element by the prefix.
2. Determine the name of the 1st element.
3. Write the symbol of the 1st element and use the prefix number as the subscript.
4. Determine the number of atoms of the 2nd element by the prefix.
5. Determine the symbol of the second element.
6. Write the symbol of the second element and use the prefix number as the subscript.
7. Example:

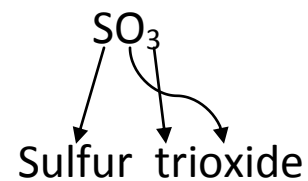


Binary Compounds

Nonmetal and nonmetal

Write the name from the formula

1. Determine the number of atoms of the 1st element from the subscript and translate that number into a Greek prefix.
2. Determine the name of the first element.
3. Write the prefix and the name of the 1st element.
4. Determine the number of atoms of the second element from the subscript and translate that number into a Greek prefix.
5. Determine the name of the second element.
6. Write the prefix and the second element root and add **-ide**.
7. *Do not write mono- for the 1st element, only for the 2nd element when needed.*
8. Example:



Nomenclature Summary

Ternary Compounds

Metal and Polyatomic ion

Polyatomic ions are groups of atoms covalently bonded together and have a charge

Write the name from the formula

1. Name the metal and determine the charge for the metal ion.
2. Write a correct name for the metal ion.
 - a. If the metal has a fixed charge, just name the metal
 - b. If the metal can have more than one charge
 - i. Use the Stock system which requires a Roman numeral.
 - ii. Use the root name for the metal and add the correct prefix. (-ous or -ic)
3. Name the polyatomic ion, (see reference list)
4. Example:



The 3 nitrate ions will bring a total -3 charge; therefore the iron has to contribute +3 so the compound will be neutral.

The correct names are iron (III) nitrate or ferric nitrate.

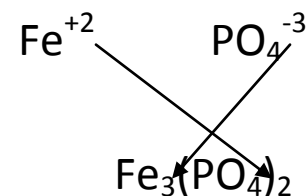
Ternary Compounds

Metal and Polyatomic ion

Write the formula from the name

1. Write the symbol and charge of the metal ion.
2. Write the symbol and charge of the polyatomic ion.
3. Drop the charges and crisscross the numbers.
When more than one polyatomic ion is needed in a formula, parentheses are used to denote the ions. Subscripts are placed outside of the parentheses.
4. Example:

Iron (II) phosphate
(aka ferrous phosphate)



Nomenclature Summary

References you really need to know:

Names of common metals with variable charges

Cu^{+1}	cuprous	copper (I)
Cu^{+2}	cupric	copper (II)
Fe^{+2}	ferrous	iron (II)
Fe^{+3}	ferric	iron (III)
Pb^{+2}	plumbous	lead (II)
Pb^{+4}	plumbic	lead (IV)
Sn^{+2}	stannous	tin (II)
Sn^{+4}	stannic	tin (IV)

Greek Prefixes

mono-	one
di-	two
tri-	three
tetra-	four
penta-	five
hexa-	six
hepta-	seven
octa-	eight

Common Polyatomic Ions

NO_3^{-1}	nitrate
NO_2^{-1}	nitrite
OH^{-1}	hydroxide
CO_3^{-2}	carbonate
HCO_3^{-1}	bicarbonate or hydrogen carbonate
SO_4^{-2}	sulfate
SO_3^{-2}	sulfite
PO_4^{-3}	phosphate
ClO^{-1}	hypochlorite
$\text{C}_2\text{H}_3\text{O}_2^{-1}$	acetate
NH_4^{+1}	ammonium

Notes:

Do not reduce nonmetal/nonmetal formulas. These are molecular formulas.

Do not reduce the formulas of mercury compounds.

The prefix bi- on a polyatomic ion name indicates that hydrogen is part of the ion symbol.